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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/539,334	06/15/2005	Geetha Arthanari	BUR920020005US1	7342

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INTERNATIONAL BUSINESS MACHINES CORPORATION  
DEPT. 18G  
BLDG. 300-482  
2070 ROUTE 52  
HOPEWELL JUNCTION, NY 12533

EXAMINER

PARIHAR, SUCHIN

ART UNIT	PAPER NUMBER
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2825

DATE MAILED: 06/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/539,334

Applicant(s)

ARTHANARI ET AL.

Examiner

Suchin Parihar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 June 2005.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-10 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 15 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

This office action is in response to application 10/539,334, filed on 6/15/2005. Claims 1-10 are pending in this application.

#### ***Specification***

1. The abstract of the disclosure is objected to because the abstract contains drawing references need to be removed. The abstract is merely a narrative description of the invention. Correction is required. See MPEP § 608.01(b).
2. The abstract of the disclosure is objected to because: Title of the Invention does not belong on the abstract page, please remove it. Correction is required. See MPEP § 608.01(b).

#### ***Claim Objections***

3. Claim 2 and 3 are objected to because of the following informalities: Because the phrase "calculating a center" does not find proper support in Applicant's specification, Examiner has interpreted this phrase as: calculating or finding a center of a shape(s) based on geometric means that are well known in the art. Appropriate correction is required.
4. Claim 3 objected to because of the following informalities: Examiner suggests the word "locates" be deleted from line 5 of claim 3. Another change that clarifies said language will be considered acceptable. Appropriate correction is required.
5. Claims 1-4 and 6-9 objected to because of the following informalities: Please remove the drawing references from the claims. Appropriate correction is required.

6. Claim 3 is objected to because of the following informalities: Please change "placability" to --placeability--. Appropriate correction is required.
7. Claims 2-9 are objected to because of the following informalities: For proper antecedent basis, the indefinite article 'A' should be changed to the definite article "The" in the preamble of claims 2-9. Appropriate correction is required.
8. Claim 10 is objected to because of the following informalities: Please change "any of claim 1 through claim 9" to --any **one** of claim 1 through claim 9--. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. **Claims 6-8 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Applicant's specification fails to enable one skilled in the art to perform "calculating for each of a set of columns and rows a potential improvement in symmetry".

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. **Claims 1, 2, 9 and 10 are rejected under 35 U.S.C. 103(a)** as being unpatentable over Carrig et al. (5,339,253) in view of Zhu (5,866,924).

13. With respect to claims 1 and 10, Carrig teaches: collecting a set of sink locations in a master list (i.e. creating a list of sinks to be connected which includes sink locations, Col 2, lines 32-35); selecting a temporary insertion point (i.e. establishing a driving point, Col 2, lines 40; the TIP and the driving point both effectively start the branching process as described on page 3 of Applicant's specification); removing the first subset from the master list (i.e. removing the paired sinks from the list of sinks, Col 2, lines 47-48); assigning a first-level structured clock buffer (i.e. a buffer circuit can be added at the sink, Col 6, lines 40-45); repeating steps (a), (b) and (c) for the remaining sinks in the first-level of buffers and subsequent levels until the root level is reached (i.e. repeating steps until the list of sinks contains only a single sink to be connected to each signal [i.e. root level], Col 2, lines 49-52); connecting the root level TIP to lower levels (i.e. using driving points to create another level of the distribution tree, Col 7, lines 15-22); and connecting a source of clock signals to the root level (i.e. connecting single sink to the source, Col 2, lines 53-54). Carrig does not teach: a set of blocked areas; enclosing the sink at the first level furthest from the TIP; and improving the symmetry of the tree by moving SCB locations within constraints to concentrate SCBs in rows and

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columns. However, Zhu teaches: a set of blocked areas (i.e. obstacle 572 of Figure 5C); enclosing the sink at the first level furthest from the TIP (i.e. branch is formed between the clock source and the clock sink that is farthest from the source, Col 6, lines 25-30); and improving the symmetry of the tree by moving SCB locations within constraints (i.e. symmetric fashion, creating design constraints, Col 2, lines 45-50) to concentrate SCBs in rows and columns (i.e. finding a path for horizontal and vertical wires that will avoid any obstacles, Col 8, lines 28-35). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate Zhu into the invention of Carrig for the following reason(s): Zhu would improve the skew-controlled distribution network of Carrig by spacing clock sinks in a symmetric fashion, which, as Zhu suggests in Col 2 lines 45-50 would minimize (i.e. control) clock skew. For article of manufacture in computer readable form, see Carrig, Col 11, lines 12-20, data input device and/or program storage.

14. With respect to claim 2, Carrig in view of Zhu teaches all the elements of claim 1, from which the claim depends. Carrig does not teach: the step of selecting a TIP comprises calculating a center of sinks and a centroid of sinks and automatically placing said TIP at one of said center, centroid or an intermediate point between said center and centroid in accordance with an algorithm that locates available space. However, Zhu teaches: the step of selecting a TIP comprises calculating a center of sinks and a centroid of sinks and automatically placing said TIP at one of said center, centroid or an intermediate point between said center and centroid in accordance with an algorithm that locates available space (calculating a balance point [location for the TIP] which is

effectively at the center of two sink locations  $[x1, y1]$  and  $[x2, y2]$ , Col 5, lines 1-53).

Examiner notes that the equation on page 5 of Applicant's specification, wherein the mean of all sinks is determined, is effectively equal to the equation found in Zhu Col 5, lines 45-53. Both sets of equations determine a center point located at the center of a set of extreme coordinates of sink locations.

15. With respect to claim 9, Carrig in view of Zhu teaches all the elements of claim 1, from which the claim depends. Carrig teaches: said SCB assigned to a subset of sinks is selected from a set of pre-designed SCBs of varying capacity (a buffer is added at one or both of the sinks to drive them, and this effectively changes both the latency requirements and input capacitance of the sinks, Col 5, lines 45-50, wherein the buffer's pre-designed capacities have an effect on the sinks by changing their requirements).

16. **Claims 3, 4 and 5 are rejected under 35 U.S.C. 103(a)** as being unpatentable over Carrig et al. (5,339,253) in view of Zhu (5,866,924) and in further view of Bergeron et al. (6,609,228).

17. With respect to claim 3, Carrig in view of Zhu teaches all the elements of claim 2, from which the claim depends. Carrig in view of Zhu fails to teach: calculating a center of sinks and a centroid of sinks and automatically placing said TIP at one of said center, centroid or an intermediate point between said center and centroid in accordance with an algorithm that locates and selectively weights one or more of delay, power consumed and place-ability. However, Bergeron teaches: calculating a center of sinks and a centroid (i.e. discussion of cluster centroid, Col 6, lines 27-35) of sinks and automatically placing said TIP at one of said center (i.e. placing clock tree source at

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center of cluster, Col 4, lines 14-17), centroid or an intermediate point between said center and centroid in accordance with an algorithm (i.e. optimization method, Col 3, lines 25-35) that locates and selectively weights one or more of delay, power consumed and place-ability (i.e. optimization method which alters connections [Col 3, lines 10-20] to reduce capacitance thus reducing power consumption, Col 2, lines 50-55). It would have been obvious to one of ordinary skill in the art to incorporate Bergeron into the inventions of Carrig and Zhu for the following reason(s): the optimization method of Bergeron would improve Carrig and Zhu by providing a method to cluster clocked devices in a way that decreases overall power consumption.

18. With respect to claim 4, Carrig in view of Zhu teaches all the elements of claim 1, from which the claim depends. Carrig in view of Zhu fails to teach: attempting to place a horizontal SCB then attempting to place a vertical SCB in a central location when a horizontal SCB will not fit in said central location (i.e. adjusting positions [vertical and horizontal] of clock feeding circuits with design constraints to further reduce said lengths of said wires, Col 8, lines 54-58). It would have been obvious to one of ordinary skill in the art to incorporate Bergeron into the inventions of Carrig and Zhu for the following reason(s): the optimization method of Bergeron would improve Carrig and Zhu by providing a method to cluster clocked devices in a way that decreases overall power consumption.

19. With respect to claim 5, Carrig in view of Zhu and in further view of Bergeron teaches all the elements of claim 4, from which the claim depends. Bergeron teaches: said vertical SCB comprises a set of circuit elements laid out to have substantially the



same delay as a corresponding SCB with horizontal layout (i.e. achieving a uniform delay to all latch clusters, Col 3, lines 50-55).

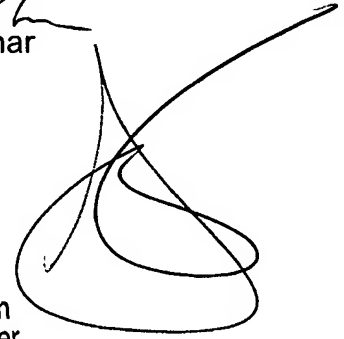
### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Suchin Parihar whose telephone number is 571-272-6210. The examiner can normally be reached on Mon-Fri, 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Chiang can be reached on 571-272-7483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
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